



## Subject card

Subject name and code	Radio Sensor Networks and Internet of Things, PG_00056861						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Radiocommunication Systems and Networks -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jarosław Sadowski				
	Teachers		dr hab. inż. Jarosław Sadowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	15		2.0		8.0	25
Subject objectives	To get the principles of operation and method of designing digital radio communication networks based on the examples of wireless sensor networks						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W05] Knows and understands, to an increased extent, methods of process and function support, specific to the field of study.		Student knows rules of designing radio networks for data transmission.		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_W03] Knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum.		Student knows the structure and principles of operation of typical wireless sensor networks on system and component level.		[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	<ol style="list-style-type: none"><li>1. Characteristics of wireless sensor networks.</li><li>2. Structures and topologies of wireless sensor networks.</li><li>3. Physical layer of radio links for sensor networks.</li><li>4. Data link layer structure for sensor networks.</li><li>5. Multiple access methods.</li><li>6. Routing in sensor networks.</li><li>7. Synchronization of WSN nodes.</li><li>8. Architectures and protocols.</li><li>9. Resources management and routing in energy-efficient networks.</li><li>10. Location-aware sensor networks and positioning services in IoT.</li><li>11. Sensor network standards.</li><li>12. Cellular IoT standards.</li><li>13. Examples of radio modems for WSN.</li><li>14. Examples of IoT modems and their applications.</li><li>15. Applications of sensor networks.</li></ol>						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Student's activity	0.0%	15.0%
	Test at the end of semester	50.0%	85.0%
Recommended reading	Basic literature	Zhao, Gibas: Wireless Sensor Networks – An Information Processing Approach, Elsevier 2004 Karl, Willig: Protocols and Architectures for Wireless Sensor Networks, Wiley 2005 Callaway: Wireless Sensor Networks – Architectures and Protocols, Auerbach Publications 2004	
	Supplementary literature	Cayirci, Rong: Security In Wireless Ad Hoc and Sensor Networks, Wiley 2009	
	eResources addresses	Adresy na platformie eNauczanie: Radiowe sieci sensorowe i Internet Rzeczy (2023) - Moodle ID: 32745 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32745">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32745</a>	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		